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Entry Document - Letter from the President

Good Morning,

Intel has received information that a non-sanctioned nation is developing biological and chemical agents to be used to attack various indigenous tribes in their respective country. We have reason to believe that this country may also be selling and distributing these weapons to known terrorist groups to be used against developed countries. Secret service agents have found through reconnaissance missions that this country is manufacturing weapons that disrupt protein function, and possibly protein development. The British have informed us that they are beginning to educate the public on these weapons by utilizing high school and university biology and chemistry students on the effects of these weapons. The French and Russians have begun to put an incredible focus on protein research to create preventive medicines for human consumption. We are now looking to you to provide a similar educational program with an emphasis on proteins. I want you to provide a detailed presentation on these protein inhibitors and how they cause damage to the human body. Therefore, I would like you to form a task force to investigate the composition of five biological weapons and their effect on protein production, structure & function. In this investigation I would like you to explain the possibly impacts of biological & chemical weapons are on humans, and present your findings to my cabinet members. Hopefully, with your information we can develop ways to reduce the drastic impacts of these weapons on civilians. We, as a country, need to be ready for these weapons.

Sincerely,

George Bush

P.S. This non-sanctioned nation is believed to harbor similar terrorist groups to the group that introduced sarin gas into the Tokyo subway system. Read the report

Organic Compounds

The President has asked you to do research on three problems to reduce the physiological effects of biological weapons. Please feel free to develop a list of need to knows to bring up in front of the class so that we can create an effective plan to eradicate the human effects of these weapons. Please use the rubric to develop a scope for each question, thank you

1) provide a detailed presentation on these protein inhibitors (biological weapons) and how they cause damage to the human body.

2) investigate the composition of five biological weapons and their effect on protein production, structure & function.

3) Explain the possible impacts of biological & chemical weapons on humans, and present your findings to my cabinet members.

[link]

Like other biological **macromolecules** such as **polysaccharides** , **lipids**, and **nucleic acids** , proteins are essential components of all living organisms and are involved in every process within a living cell. Many proteins are **enzymes** that **catalyze** biochemical reactions within the **cell**, and are critical to **metabolism** . Other proteins are structural or mechanical parts of a cell, such as the proteins in a cell's **cytoskeleton** , which form a system of **scaffolding** that maintains the cell's shape and size. Proteins are also important in **cell signaling** , the **immune response**, **cell adhesion** , and the **cell cycle** . Protein is also a necessary component in the diet of humans and other animals that cannot synthesise all amino acids and must obtain **essential amino acids** from their diet. Through the process of **digestion**, animals break down ingested protein into free amino acids that can be used for further protein

Project Guidelines

Rationale: Biological & chemical weapons have been utilized by several countries throughout the past few centuries. These weapons have been designed to kill human beings through the use of micro-organisms or lethal chemicals. The need for educating the public on how these weapons cause injury and death are extremely important in today's society. Furthermore, by understanding the negative effects of these weapons on a microscopic level the youth will have the knowledge to advocate for preventive measures for humans. Of course, the advocation for the eradication of these weapons across the globe would be the ultimate goal. Overall, the team is driving toward answering the following question:

How could we minimize human injuries if these weapons continued to be used?

Sarin Incident

IDENTIFYING ORGANIC COMPOUNDS

PURPOSE: What are the four common organic compound groups?

BACKGROUND: The most common organic compounds found in living organisms are lipids, carbohydrates, proteins, and nucleic acids. Common foods, which often consist of plant materials or substances derived from animals, are also combinations of these organic compounds. Simple chemical tests with substances called indicators can be conducted to determine the presence of organic compounds. A color change of an indicator is usually a positive test for the presence of an organic compound. In this investigation you will use several indicators to test for the presence of lipids, carbohydrates, and proteins in foods.

MATERIALS:

safety goggles
test tubes
test tube brush
indicator reagents
hot plate
test plate
droppers
test tube rack
test substances
beaker (for hot water bath)
filter paper

PROCEDURE:

1. Construct a data table similar to table 1.
2. Fill in the substances being tested in your table.
3. As you complete each series of tests record your results in your table.
4. **Biuret** indicates the presence of protein. A positive test is indicated by a slight purple tinge in the center of the depression.
   Using the white test plate;
   Add 3 drops of substance being tested
   Add 2 drops of Biuret Reagent
   ****CAUTION STRONG BASE****
5. **Iodine** detects the presence of starch. A positive reaction will result in dark blue/black color.
   Using the white test plate;
   Add 3 drops of substance being tested
   Add 1 drop of Iodine

6. **Indophenol** indicates the presence of vitamin C. The blue color of indophenol becomes clear in the presence of Vitamin C.
   Using the white test plate;
   Add 3 drops of the substance being tested
   Add 2 drops of Indophenol
7. **Silver Nitrate** ($AgNO_3$) indicates the presence of Chloride ions. A positive reaction results in white, milky color.
   Using the micro-testplate;
   Add 3 drops of the substance being tested
   Add 1-2 drops of silver nitrate
8. **Benedict's Test** detects the presence of glucose and other simple sugars but NOT Polysaccharides. An orange color indicates a high glucose content.
   Label 8 test tubes (1-8)
   Add 20 drops of substance being tested into a test tube
   Add 10 drops of Benedicts solution
   Place the test tube in the hot water bath for five minutes
   Record any color changes in your data table
9. **Sudan III** detects the presence of lipids.
   Divide the circular filter paper into 8 pie shape sections, number each section (1-8) with pencil.
   Place 1 drop of substance being tested on the paper in the proper section.
   Allow the filter paper to dry.
   Soak the filter paper in the Sudan III solution for 5 minutes.
   Rinse the filter paper in the water bath for 3 minutes.
   Pat dry with a paper towel.
   Cut the filter paper in a circular manner providing each partner with a section of each substance tested.
   Tape this portion in your data book.

DATA/OBSERVATIONS:

Table 1 Test Observations

Test -> Substance	Biuret	Iodine	Benedict's	Indophenol	Silver Nitrate	Sudan III
1						
2						
3						
4						
5						
6						
7						
8						

CALCULATIONS/RESULTS:

QUESTIONS:

1. Which substances tested positive for monosaccharides?
2. Which substances tested positive for polysaccharides?
3. Which substances tested positive for proteins?
4. Which substances tested positive for lipids?
5. Which substances tested positive for chloride?
6. Which substances tested positive for all organic compounds?
7. Why does heat help the reaction with the Benedicts test?
8. Biuret Reagent will turn your skin purple. Why is this true?

DISCUSSION:

CONCLUSION:

Useful Web-Sites

Biology threat agents: **http://www.fas.org/biosecurity/resource/agents.htm**

General Introduction on Biological, biochemical, & chemical weapons **http://science.howstuffworks.com/framed.htm?parent=biochem-war.htm&url=http** ://www.slic2.wsu.edu:82/hurlbert/micro101/pages/101biologicalweapons.htm l

Medical Research: **http://www.uh.edu/collegium/fall98/medical.html**

Pathophysiology of chemical weapons:

http://www.clevelandclinicmeded.com/diseasemanagement/infectiousdisease/ chemical/chemical.htm#pathophysiology

Enzymes: **http://en.wikipedia.org/wiki/Enzyme**

Enzyme Inhibitors: **http://en.wikipedia.org/wiki/Enzyme**

Enzyme Inhibitor (more): **http://en.wikipedia.org/wiki/Enzyme_inhibition**

Poisons: **http://en.wikipedia.org/wiki/Poisons**

Content Rubric

SORRY, THIS MEDIA TYPE IS NOT SUPPORTED.	BiologyBiochemical Rubric			
CRITERIA	WEIGHT	UNSATISFACTORY(Below Performance Standards)	PROFICIENT(Criteria)	
Organic Compoundsmost macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors.	**10%**	Does not use words, diagrams, or examples to describe the following properties of organic compounds: - The synthesis of carbohydrates, proteins, & lipids - The reduction of macromolecules - The chemical structure of amino acids, monosaccharides, & a fatty acid - The importance of water in chemical reactions - Does not describes 3 examples of proteins (structure & function)	Describes with words, diagrams, and examples the following properties of a n organic compound - The synthesis of carbohydrates, proteins, & lipids - The decomposition reactions of macromolecules - The chemical structure of amino acids, monosaccharide, & fatty acids - The importance of water in chemical reactions - Describes 3 examples of proteins (structure & function)	*In addition t the PROFIC criteria …* - Compar contrast dehydra synthes hydroly - Describ exampl proteins them to importa human - Describ chemica differen unsatur saturate - Compar contrast structur compos functio proteins carbohy nucleic - Explain relation betwee standar questio
		0 - - - - - - - - - - - - - -	7 - - - - - - - - - - - - - -	9 - - - - - - - -

		- - - - - - - - - -6	- - - - - - - - - - - - - - - - - 8	- - - - - - - - -
Protein Synthesis*Students know* how to apply base-pairing rules to explain precise copying of DNA during semi conservative replication and transcription of information from DNA into mRNA.Students can explain the role of tRNA in protein synthesis	**20%**	Does not use words, diagrams, or examples to describe the following properties of organic compounds: • base-paring in regards to D.N.A. replication • base-paring in regards to transcription • Reason for semiconservative replication • The role of mRNA	Describes with words, diagrams, & examples the following: • base-paring in regards to D.N.A. replication • base-paring in regards to transcription • Reason for semiconservative replication • The role of mRNA • The role of tRNA	*In addition the PROFI criteria …* • Expla value under the re betwe acids protei • Descr metho learni synthe • Descr impor semic replic • Expla relatio betwe standa drivin
		0 -6	7 - 8	9 - - - - - - - - - - - - - - -
Nucleic Acid Composition*Students know* the general structures and functions of DNA, RNA, and proteins.	**10%**	Does not use words, diagrams, or examples to describe the following properties of organic compounds: • The structure & function of D.N.A.	Describes with words, diagrams, & examples the following: • The structure	In addition to m PROFICIENT c • Evaluates importance understand nucleic aci proteins in biochemic

		- The structure & function of R.N.A. - The structure & function(s) of proteins - The precursors that create both D.N.A & R.N.A - The structural & functional differences between R.N.A & D.N.A	& function of D.N.A. - The structure & function of R.N.A. - The structure & function(s) of proteins - The precursors that create both D.N.A & R.N.A - The structural & functional differences between R.N.A & D.N.A	- Combines learned inf to explain structure o acids - Predicts or possibly n into learne informatio
		0 -10	11 - 13	14 -
PresentationStructure	10%			
		- No introduction - Presentation is unorganized - No conclusion/summary of results - Driving Question not addressed - No multimedia used for presentation - No model was used during presentation	- Introduction that describes the problem and objectives - Provides a conclusion/summary of results - Presentation has clear goals & objectives - Driving question is addressed - Model used during presentation - Multimedia format was used for 6	In ad meeti PRO criteri - S u t f r f p - F p e & r

			minutes of the presentation	e s c c • N c a e
		0 -6	7 - 8	9 - - - - - - - - - - -
Enzymes*Students know* enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings.	**20%**	Does not use words, diagrams, or examples to describe the following properties of organic compounds: • Structure & Function of enzymes • Reaction equilibrium • Activities of enzymes are dependent on the temperature, ionic conditions, & pH of the surroundings	Describes with words, diagrams, & examples the following: • Structure & Function of enzymes • Reaction equilibrium • Activities of enzymes are dependent on the temperature, ionic conditions, & pH of the surroundings • Active site, substrate, & enzyme-reaction synthesis	*In addition the PROFI criteria …* • Explai effects chemi weapo enzym & fun • Predic physic outcor chemi weapo humar • Formu hypotl effects bioche weapo enzym compl •
		0 -6	7 - 8	9 - - - - - - - - - - - - - - -
Model AssessmentStudents develop a model to explain protein	**30%**			

development or function to aid in the teaching of the impact/effects of biochemical warfare		- The model is incorrectly used to explain protein synthesis or an enzyme reaction - The presenter does not describe the limitations of the model	- The model illustrates the steps involved in protein synthesis or an enzyme reaction - The presenter explained the limitations of the model	- The presenter how protein s enzymatic rea be inhibited b biological or agent - The presenter model as a ba explanation - The presenter an authentic s the problem - The presenter model as a ba explaining the
		0 -6	7 - 8	9 - 10

ADDITIONAL COMMENTS:

New Technology High School 2002

Content Standards Covered by Project

a. *Students know* enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings.h. *Students know* most macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors.

a. *Students know* the general pathway by which ribosomes synthesize proteins, using tRNAs to translate genetic information in mRNA.

a. *Students know* the general structures and functions of DNA, RNA, and protein.b. *Students know* how to apply base-pairing rules to explain precise copying of DNA during semiconservative replication and transcription of information from DNA into mRNA.

Lab Rubric

	Patrick F. Taylor Science & Technology AcademyLab Report Rubric Project _______________	STUDENT: _____________ ___________ EVALUATOR

CRITERIA	UNSATISFACTORY(Below Performance Standards)	PROFICIENT(Minimal Criteria)	ADVA Perfo
Content Literacy(60%)	Students show a lack of respect for the equipment by using it inappropriately.Students do not state the problem as a logical cause and effect. Students write a hypothesis without an “IF, THEN” statement.Material list is incomplete.Procedure lacks important details.Data table is incomplete or inaccurate. Graph is inaccurate or lacks essential features. Qualitative descriptions are vague or inaccurate.	Students respect the equipment and only use it for experimentation purposesStudents state the problem with independent and dependent variables in a cause and effect relationship.Students write the hypothesis as a logical “IF, THEN” statement.Materials list is complete. Procedure is described in numbered steps.Quantitative data is recorded in table with appropriate headings and units. Graph is accurate and labeled. Qualitative data is descriptive.	In addition to meeting the PROFICIENT criteria … Experiment could easily be replicated based on description of process and operational definitions.Graph of quantitative data is accurately drawn AND contains title, labels, units. A logical connection is maintained among the problem, hypothesis and results discussion.
	0 - - - - - - - - - - - - 20--- ------------------39	40-------------------- -46	47- - - - - - - - - - - - - - 50

Critical Thinking(25%)	Conclusion lacks some of the items in the proficient category.	Conclusion: Student • Describes the purpose of the experiment, • Describes the major findings with operational definitions, • Explains the findings in terms of the validity of the hypothesis, • Explains the results in terms of vocabulary and content of the current unit.	In addition to meeting the PROFICIENT criteria , CONCLUSION • Compares work to similar research, either among classmates or outside sources. • Offers helpful suggestions for improvement and further study.
	0 - - - - - - - - - - - - 15 - - - - - - - - - - - - 29	28 - - - - - - - - - - - - 32	33 - - - - - - - - - - - - 35
Written Expression(15%)	• Conventional rules of grammar, punctuation, and spelling are NOT followed. • Student writing contains pronouns and vague statement.	• Conventional rules of grammar, punctuation and spelling are followed. • Major sections of the lab report are identified by heading.	In addition to meeting the PROFICIENT criteria … • Writing conveys an exceptional mastery of scientific language and vocabulary.
	0 - - - - - - - - - - - - 5 - - - - - - - - - - - - 11	12- 14	15

TOTAL:

COMMENTS: **New Technology Foundation 2001-2005**

Oral Communication Rubric

New Tech High School

Oral Presentation Rubric

Name:

Oral Presentation	100 pts	The presenter is dressed in unprofessional or inappropriate attireThe presenter **DOES NOT** uses props, visual aids, graphs and electronic media **OR** props/ aids which **DETRACT** from the appeal and accuracy of the presentationThe presenter **DOES NOT** look at the audience of reads directly from the PowerPoint.If the presenter is using note cards, they read directly from the note cards and do not look up at the audience.The presenter:	The presenter is dressed in Interview DressThe presenter uses props, visual aids, graphs and electronic mediaThe presenter speaks directly at the audience and **DOES NOT** read from the PowerPoint.If the presenter is using note cards, they look down at the material sporadically.The presenter: • Uses a good speaking voice and pronounces words clearly, correctly, and without verbal fillers	**In addition to meeting the PROFICIENT criteria** The presenters uses of props, visual aids, graphs and electronic media to ENHANCE the appeal and accuracy of the presentation.The presenter speaks directly at the audience and has the speech or dialogue memorizedThe presenter: • Uses a strong and clear speaking voice • Maintains eye contact with the audience • Uses energetic gestures and facial

		• Voice is inaudible or unclear • Maintains little to no eye contact with the audience • Uses physical gestures which distract from the presentation Presentation DOES NOT take the appropriate time (either too short or too long)If a Power Point is used: • The slides have text which is presented in paragraphs • The slides detract from the presentation • Animations or transitions were a distraction. • Design was **NOT** consistent throughout \0------------------50----------------69	• Maintains partial eye contact with the audience • Uses physical gestures which do not distract from the presentation Presentation takes the appropriate timeIf a Power Point is used: • The slides have bulled items, not paragraphs • The slides added, did not detract, from the presentation • Layout, fonts, and graphics used were easy to see • Design was consistent throughout 70---------------80----------------89	expressions which do not distract from the presentation If a Power Point is used: • Presenter creatively integrated a variety of objects, charts, and graphs to amplify the message 90--------------95-------------100

Team Contract Template

SORRY, THIS MEDIA TYPE IS NOT SUPPORTED.	BiologyTeam Contract

Project Name: ______________________________

Project Start Date: _________________________ **Project End Date:** __________________________

Team Members/Personal Information

Name	Phone	Email

Team Agreements and Ground Rules

Issue	**Agreement(s)**

Collective Purpose	
Specific Performance Goals	
Commitment to work processesAgree on specific tools	
Mutual Accountability	
Optional)	
Other	

How will you develop a trusting team?

(tools e.g. Personal History Exercise, Team Effectiveness Exercise)

How will you develop the ability and willingness to engage in healthy conflict?

(tools e.g. Real-Time Permission)

How will you ensure commitment?

(tools e.g. Cascading Messaging)

How will you establish clarity & buy-in?

Describe specific deadlines that you will meet for this particular project?

How will you ensure that your attention is focused on results?

How will you ensure that all team members are involved in the decision-making process?

Develop a timeline that will help you map out the project.

Proposed Timeline

	When **is it to be Completed**	*Who* **is Primarily Responsible**
Benchmark 1:		
Benchmark 2:		
Benchmark 3:		
Benchmark 4:		
Final Product		

Signatures

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